

REMARKS

Applicants respectfully request further examination and reconsideration in view of the arguments set forth fully below. In the Office Action mailed December 22, 2006, claims 1-20 have been rejected. In response, the Applicants have submitted the following remarks. Accordingly, claims 1-20 are still pending. Favorable reconsideration is respectfully requested in view of the remarks below.

Rejections Under 35 U.S.C. §102

Claim 1 has been rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 7,069,069 to Fishler et al. (hereinafter Fishler). The Applicants respectfully disagree with this rejection.

Fishler teaches an implantable cardiac device and method for providing monitoring of a progression or regression in heart disease over an extended time period. The Fishler reference teaches determining morphology measurements from a patient that indicate progression or regression in heart disease (Fishler, abstract). Within the Office Action it is stated that in column 2, lines 21-25, the Fishler reference teaches using at least one morphology shape descriptor to determine a total quantity of values representing the total quantity of representative beats. The Applicants respectfully indicate that such teaching does not exist in Fishler. Specifically, the Applicants direct the Examiner to the claims and teaching of the present invention that the present invention determines **a total quantity of values** representing the total quantity of beats. Referring to column 2, lines 21-25 of Fishler, it is clear that the Fishler reference only teaches extracting and quantifying at least one morphology feature of selected cardiac cycles to determine morphology measurement data, but does not derive a total quantity of representative beats, and further determines a total quantity of values representing that total quantity of beats.

In contrast to the teachings of Fishler, the method and apparatus for detecting cardiac repolarization abnormality of the present invention includes using at least one morphology shape descriptor to determine a total quantity of values representing a total quantity of representative beats. As discussed above, the method and apparatus for detecting cardiac repolarization abnormality teaches and claims deriving a total quantity of representative beats

of the electrocardiogram signal and determining a total quantity of values representing the total quantity of representative beats. This allows a user to assess cardiac repolarization abnormality to utilize data corresponding to at least some of the total quantity of values, and not a selected cycle or beat, as is used in the Fishler reference. The Applicants respectfully submit that Fishler does not teach determining a total quantity of values representing the total quantity of representative beats.

The independent claim 1 is directed to a method of detecting a method of cardiac repolarization abnormality using at least one electrocardiogram signal comprising deriving a total quantity of representative beats of the at least one electrocardiogram signal, using at least one morphology shape descriptor to determine a total quantity of values representing the total quantity of representative beats, wherein the morphology shape descriptor utilizes any one of the following morphology features to determine the total quantity, a maximum morphology feature, a minimum morphology feature, an area morphology feature, an amplitude morphology feature, a slope morphology feature and a time interval morphology feature and using data to corresponding to at least some of the total quantity of values to assess cardiac repolarization abnormality. As discussed above, Fishler does not teach using the at least one morphology shape descriptor to determine a total quantity of values representing the total quantity of representative beats. For at least these reasons, the independent claim 1 is allowable over the teachings of Fishler.

Claim 1 has been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,571,122 to Schroepell at el. (hereinafter Schroepell). The Applicants respectfully disagree with this rejection.

Schroepell teaches an implantable medical device responsive to heart rate variability analysis. As is discussed above with reference to the Fishler reference, Schroepell also evaluates heart rate variability by receiving heartbeat signals from the heart and determines a measurement of heart rate variability based upon statistical data derived from the heart beat signals. The Schroepell reference compares the variability with previously stored variability zones (Schroepell, abstract). Referring to the columns of Schroepell cited by the Examiner, specifically column 4, lines 11-24, akin to the teachings of Fishler discussed above, the Schroepell reference computes time intervals occurring between success of

heartbeats and then derives a measurement of heart rate variability from epoch data for predetermined time periods. The Schroepell reference then compares the measurement of heart rate variability with previous stored variability zones. As discussed above with respect to Fishler, the Schroepell reference does not teach deriving a total quantity of representative beats and determining a total quantity of values representing the total quantity of representative beats. For at least these reasons, being the same reasons as discussed above with reference to Fishler, claim 1 is allowable over the teachings of Schroepell.

Claims 1, 3, 6, 15, 16, and 20 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,531,527 to Reinhold et al. (hereinafter Reinhold). The Applicants respectfully disagree with this rejection.

Again, as was discussed above with respect to Schroepell and Fishler, the Reinhold reference teaches an ambulatory monitoring system with real time analysis and telephone transmission, that includes sampling an EKG signal that provides a plurality of EKG signal samples, and analyzing the samples in real-time and according to predetermined criteria (Reinhold, column 4, lines 30-40, as cited by Examiner). Again, the Reinhold reference teaches measuring these collected waveforms against predetermined arrhythmia criteria (Reinhold, column 5, lines 19-21, as cited by the Examiner). In contrast to the teachings of the present invention that determines a total quantity of representative beats and determines a total quantity of values representing the total quantity of representative beats, the Reinhold reference teaches that each heartbeat is compared with heartbeats already stored as a template in the EKG storage bins, and if any of the heartbeats are similar to the templates previously stored, the tally for the number of beats corresponding to the template is incremented by 1, and the beat under consideration is compared with each template that is already stored in bins to determine if there is a match with any one of them (Reinhold, column 9, line 55 through column 10, line 10, as cited by the Examiner). Again, Reinhold does not teach deriving a total quantity of the representative beats, and further determining a total quantity of values representing the total quantity of representative beats, rather, Reinhold teaches comparing each individual heartbeat to a template. For at least these reasons, claim 1 is allowable over the teachings of Reinhold.

Claims 3, 6 and 15 are dependent upon the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of Reinhold. Accordingly, claims 3, 6 and 15 are also allowable as being dependent upon an allowable base claim.

Claims 16 and 20 have also been rejected as being anticipated by Reinhold. The independent claim 16 and 21 include similar limitations to the independent claim 1, and therefore, the Applicants respectfully submit that the independent claim 16 and 20 are also allowable over Reinhold.

Rejections Under 35 U.S.C. §103

Claims 2 and 17 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Reinhold in view of U.S. Patent No. 5,215,098 to Steinhaus et al. (hereinafter Steinhaus). Claims 2 and 17 are dependent upon the independent claims 1 and 16, respectively. As discussed above, the independent claims 1 and 16 are allowable over the teachings of Reinhold. Accordingly, claims 2 and 17 are also allowable as being dependent upon an allowable base claim.

Claims 4-5, 7 and 11 having been rejected under 35 U.S.C. §103(a) as being unpatentable over Reinhold in view of previously cited Cohen. Claims 4-5, 7 and 11 are dependent upon the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of Reinhold, Schroepell, and Fishler. Accordingly, claims 4-5, 7 and 11 are also allowable as being dependent upon an allowable base claim.

Claims 12-14 have been ejected under 35 U.S.C. §103(a) as being unpatentable over Reinhold, in view of Cohen, and further in view of U.S. Patent No. 6,983,183 to Thiagarajan et al. (hereinafter Thiagarajan). Claims 12-14 are dependent upon the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of Reinhold, Stroepell, and Fishler. Accordingly, claims 12-14 are also allowable as being dependent upon an allowable base claim.

Claims 8 and 18 have been ejected under 35 U.S.C. §103(a) as being unpatentable over Reinhold, in view of U.S. Patent No. 5,713,367 to Arnold et al. (hereinafter Arnold). Claims 8 and 18 are dependent upon the independent claims 1 and 16, respectively. As discussed above, the independent claims 1 and 16 are allowable over the teachings of

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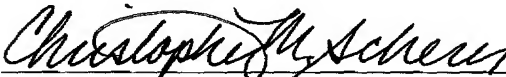
Reinhold. Accordingly, claims 8 and 18 are also allowable as being dependent upon an allowable base claim.

Claims 9-10 and 19 have been ejected under 35 U.S.C. §103(a) as being unpatentable over Reinhold and Arnold as applied to claims 8 and 18 above in view of U.S. Patent No. 6,847,840 to DePasquale et al. (hereinafter DePasquale). Claims 9-10 and 19 are dependent upon the independent claims 1 and 16. As discussed above, the independent claims 1 and 16 are allowable over the teachings of Reinhold. Accordingly, claims 9-10 and 19 are also allowable as being dependent upon an allowable base claim.

For these reasons, Applicants respectfully submit that all of the claims are now in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, they are encouraged to call the undersigned at 414-271-7590 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,

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